ATTACHMENT 8
ROG Emissions
Pesticide Application
San Joaquin Valley

EMISSION INVENTORY SOURCE CATEGORY
Solvent Evaporation/Pesticides and Fertilizer

EMISSION INVENTORY CODES (CES CODES) AND DESCRIPTION
530-530-322-50000 (83550) Agricultural Pesticides – Methyl Bromide

530-530-570-20000 (83568) Agricultural Pesticides – Non-Methyl Bromide

530-540-322-50000 (83576) Structural Pesticides – Methyl Bromide

530-540-570-20000 (83584) Structural Pesticides – Non-Methyl Bromide

METHOD FOR CALCULATING EMISSIONS

Emissions in this source category come from the application of pesticides and are estimated by the Department of Pesticide Regulation (DPR). By law, farmers and crop growers file daily and monthly, field-specific and product-specific pesticide use reports (PUR) with DPR. Subsequently, DPR uses all applicable data from the PUR to estimate TOG emissions. To calculate TOG emissions, DPR applies measured or assigned emission potentials (EPs) to the applicable PUR data. The measured EPs for any pesticide formulation are derived from experimental data obtained by thermogravimetric analysis. Most measurements for the EPs occurred between 1994 and 1999. For those pesticide formulation classes where experimental data are unavailable, DPR assigns default values (EPs), using scientific judgement considering the chemical and physical principles involved.

On an annual basis, DPR creates a database of monthly and annual base-year TOG emissions, which they then provide to the Air Resources Board (ARB). The ARB then estimates ROG emissions by applying speciation profiles to the TOG data provided by the DPR. The ARB applies growth and control factors to the DPR data to forecast future years emissions. Tables 1 and 2 show pesticide summer and winter ROG emissions in the SJV for the years 1999 and 2010. Summer is assumed to be May through October, and winter is November through April of each year.

ROG EMISSIONS IN THE SAN JOAQUIN VALLEY

Table 1: Summer* Pesticide ROG Emissions (tons per day)

Category	1999	2010
Agricultural Pesticides – Methyl Bromide	5.3	1.6
Agricultural Pesticides – Non-Methyl Bromide	26.4	32.8
Structural Pesticides – Methyl Bromide	0.0	0.0
Structural Pesticides – Non-Methyl Bromide	0.3	0.4
TOTAL	**32.0**	**34.8**

*** May - October**

Table 2: Winter** Pesticide ROG Emissions (tons per day)

Category	1999	2010
Agricultural Pesticides – Methyl Bromide	7.2	2.1
Agricultural Pesticides – Non-Methyl Bromide	17.4	22.4
Structural Pesticides – Methyl Bromide	0.0	0.0
Structural Pesticides – Non-Methyl Bromide	0.4	0.4
TOTAL	**24.9**	**24.9**

**** November - April**

GROWTH AND CONTROL ASSUMPTIONS

Growth assumptions

ARB uses growth surrogates in the California Emission Forecasting System (CEFS) to predict future year pesticide emissions based on the DPR-provided base year data. These growth surrogates were developed as a result of a 1998 ARB research contract with Pechan and Associates. Table 3 shows Pechan's growth surrogate assumptions for the four different pesticide emissions inventory codes (EICs).

Table 3. Growth Surrogates for Pesticide VOC Emissions

Emission Inventory Code (EIC)	Pechan Contract (1998)
Agricultural Non-Methyl Bromide	Farm sector output ($)
Agricultural Methyl Bromide	Farm sector output ($)
Structural Non-Methyl Bromide	Housing expenditures($)
Structural Methyl Bromide	Non-residential fixed investment combined with linear reduction to zero by 2005 to reflect Clean Air Act phase-out.

Control assumptions

Pesticide use control, primarily reformulation, is reflected in the emission inventory through the TOG/product usage ratio. The control factors are calculated to be the trend or change of that ratio from year to year. For the non-methyl bromide categories, the ratios change annually for those years that DPR provides data (1990-2001). For non-methyl bromide categories, control factors are assumed to be constant for all future years, and reflect the most recent year available.

For methyl bromide pesticide categories, the effect of the Montreal Protocol mandating the phase-out of methyl bromide by the year 2005 is reflected in our inventory.

TEMPORAL ACTIVITY

As shown in Tables 4 and 5 below, ROG emissions from pesticide usage vary by time of day, day of the week, and month of the year. As shown in Table 4, we currently assume that pesticides are applied between the hours of 7:00 a.m. and 6:00 p.m seven days a week. Table 5 shows the monthly variability in pesticide emissions on a statewide basis for the year 1999. We develop these monthly profiles for each year and by county to reflect annual and geographic variability in pesticide application.

Table 4: Daily and Weekly Temporal Activity for Pesticide ROG Emissions

Hours	Days	Weeks
11	7	52

Table 5: Percent Distribution of Pesticide ROG Emissions by Month*

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
9.7	5.4	7.2	8.3	10.2	10.9	10.8	7.1	6.5	10.8	7.0	6.1	100.0

*1999 CEIDARS Database

FUTURE IMPROVEMENTS

We are working with DPR to update the existing speciation profile as well as to address other issues related to the pesticide inventory.

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